

Tagging for TV: Design Document

A Project Presented to the Academic Faculty

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1 Abstract

In recent years, television has developed from a limited set of shows constrained by a fixed timeslot into a veritable viewer's choice of channels, shows, and times. In addition, we have seen the rise of the complex episodic series that encourages replay. Meanwhile, the Internet has grown into a media-rich, customizable experience for users who have become familiar with the concept of tagging items with keywords to foster the organization of a network. Broadcast has begun to merge with broadband in many forms, but viewers still have little to help them navigate through a show. This project, Tagging for TV, brings tagging from the Internet to television as a social, viewer-generated means of organizing data.

2 Introduction

The modern television show is one filled with intricate storylines, elaborate casts, sophisticated dialogue, time and place shifting, and other complexities. This breed of show has meaning on multiple layers and with analysis and replay, a viewer can make connections and understand a show on different levels. The Internet has enabled people to do this more easily with online collaborative communities. Since television has become more complex and there is so much content out there, a new form of contextual navigation would be beneficial to viewers. Tagging for TV aims to give the viewer the power to experience a television show contextually based on tags, by letting him or her create clips and tag them, browse by tag, and share clips with others.

In *Hamlet on the Holodeck*, Janet Murray points out two types of audiences of episodic media – those who thirst for the drama of the immediate installment and those who derive pleasure from gathering meaning of overarching themes throughout the lifetime of a story. A third audience, Murray says, exists in the digital realm: “the navigational viewer who takes pleasure in following the connections between different parts of the story and in discovering multiple arrangements of the same material” [Murray, 257]. And as Steven Johnson asserts in *Everything Bad is Good For You*, television series have gotten more complex over the past twenty years; that complexity compels the audience to analyze more than ever.

Meanwhile, people have discovered frameworks for organizing the enormous amounts of data they come across on the Internet. One such framework is tagging, and its simplicity has led to its widespread use. The Pew Internet & American Life Project found in December 2006 that 28% of Internet users have tagged items online and 7% of them are doing it daily [Rainie]. In “The Structure of Collaborative Tagging Systems”, Golder and Huberman describe that tagging is popular when there is no authority providing a good means of indexing or categorizing data *or* “there is simply too much content for a single authority to classify” [Golder and Huberman, 1]. The Internet obviously fits the latter condition. Thus sites such as del.icio.us, Flickr, Technorati, and others have grown in popularity as a means for an individual to define the content that is meaningful to him or her. This aggregation of individual tags typically grows to become an extensive and often reliable system of navigation.

I believe that the tagging method can be successfully applied to television content as a way to help people navigate television and build a bottom-up definition of content—a user-defined way of browsing content—as opposed to a predefined definition. There is simply too much information associated with video for automation to be a successful way to attach metadata, and people seem to be willing to attach the metadata themselves when given the proper tools.

3 Background

There are currently many applications and platforms that allow you to do more with television than simply watch it. Tagging within a television framework encompasses many realms—media, technology, and collaborative or social systems. With (and across) each realm are examples related to television tagging, but each is missing something in the development of a unique navigation experience that organizes and entertains people.

3.1 EXISTING TELEVISION APPLICATIONS

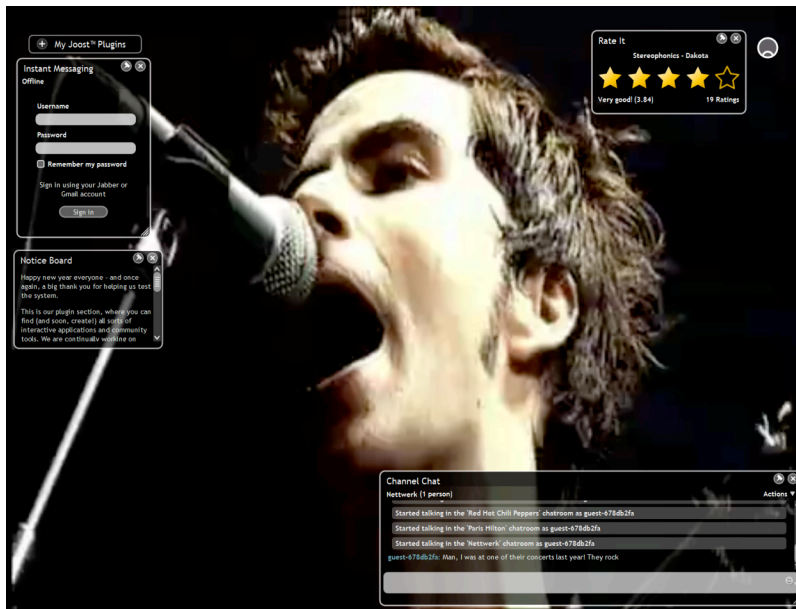
3.1.1 TiVo

Currently, television is very customizable, with the ability to record shows and play them when desired or to grab on-demand programs at any time. TiVo is one of the most popular digital video recording platforms in America. It does include keyword-based show searching (the Wish List allows you to record any show that contains a keyword in the name or description), but any further tagging ability within a show is only available to advertisers to incorporate interactive opportunities based on context (the “thumbs up” function). TiVo users can record programs that include a keyword in the description, but this is based on descriptions from the content providers. A more relevant social tagging system for TiVo lies within CozmoTV, a free online application that lets a user browse shows and set his or her TiVo to record them. It allows users to create tags for episodes and it displays those tags. One can also browse shows by tag. This system, however, doesn’t utilize deep tagging—tagging with a video—nor does it allow you to watch the shows you have recorded online (it simply tells your TiVo what to record). Nor does it provide access to the tags while watching the shows through TiVo.

3.1.2 iTV Solutions

Other television solutions, such as IPTV, video on demand, or the Windows Media Center, may allow browsing by category or tag, but fail to use deep tagging to point to specific points. Apple is releasing Apple TV, a system that brings one’s media from the computer into the living room. Its current systems (iTunes, iPhoto, etc.) utilize some tagging (such as genres or playlists in iTunes), but not deep tagging. Overall, the new connected television has the capability to utilize tagging, but thus far it has not.

Joost TV is a new player in the online television business. Joost is currently offering a beta version of their downloadable platform that pairs television content such as National Geographic with networked applications such as chat, IM, ratings, and other add-ons. It allows for a personalized viewing experience (users can pick their favorite shows to add to their individual channels and browse that way) as well as community. The platform does not feature navigation tools beyond a traditional video player, however. This could be a real opportunity to merge the networked community with new ways to view television.



Joost TV screenshot, <https://www.joost.com/screenshots/>

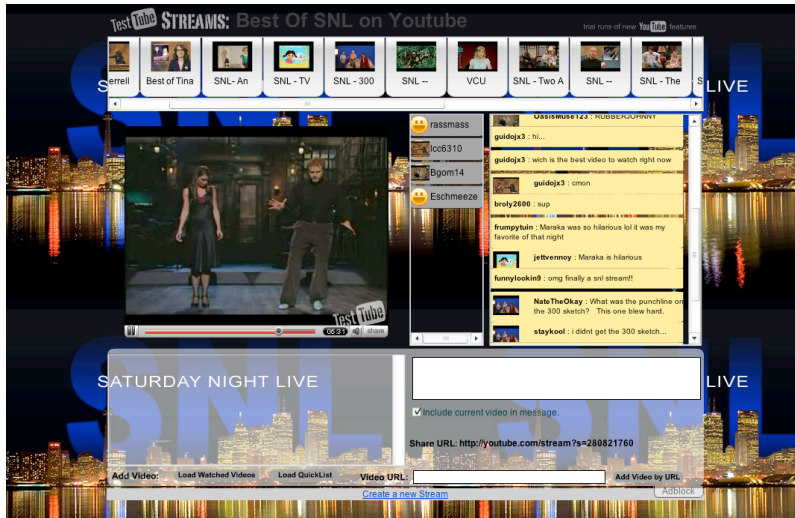
3.1.3 Streaming and Downloadable Video

As technology has enabled faster Internet speeds and larger data transfer rates, users have become more accustomed to rich media websites, streaming video, and video on multiple personal media platforms such as the iPod, PlayStation Portable, and cell phones. Networks created video players housed on their websites to stream supporting content to their broadcast shows (e.g. behind the scenes footage), but, until the past year, were reluctant to make broadcast content available due to advertising concerns.

New innovations have allowed networks to feel more comfortable with loosening the grip on their content and serving it in forms such as the iTunes pay-per-download model and new network video players that show full episodes whose ads cannot be skipped. Response to the networks' move into the digital sphere was well received. ABC and parent company Disney started selling TV shows for download for \$1.99 in the spring of 2006, and within twenty days, the iTunes online store sold 1 million [Jenkins, 253]. Other networks followed suit and each has a video player integrated in some way with their brand name (see Appendix I for screenshots and more information on Network Broadband Video Players). For these networks, though, streaming video is still in its infancy and currently does not enable more interaction than traditional video-playing controls. Tagging is a feature that could help build a network's community, but thus far has not been implemented.

3.2 EXISTING VIDEO APPLICATIONS

Online video has also exploded in the past year thanks to the wide adoption of broadband. YouTube officially launched in December of 2005, reached 100 million videos a day in July of 2006, and was purchased by Google in November of 2006. YouTube has many features that propagate the social aspect of video. For example, is shown on a page along with information about the director, a video description, tags he or she has added, ratings, the number of views, comments, and more. It also allows one to easily share the video or embed it on another website. Also key is a list of related videos (based on the titles and



YouTube Streams, <http://youtube.com/streams> main

enables live chat as well as collaborative viewing of video content.

tags), which encourages more viewership based on a theme. Aside from text comments, users can create video responses to a video, which are listed on that video's page. YouTube also has furthered their reach with the seamless embedding of videos into blogs and websites, a user-friendly API for developers, and new applications. One such application which is in beta, YouTube Streams,

This incorporation of tagging really helps organize information in terms of similar videos and optimizing searching. A drawback to the YouTube model, however, is its lack of deep tagging. A user can only respond to a whole video, not specific parts of it. Also, the person who uploads a video is the sole creator of tags for that video.

3.3 TAGGING

3.3.1 Deep Tagging in Video

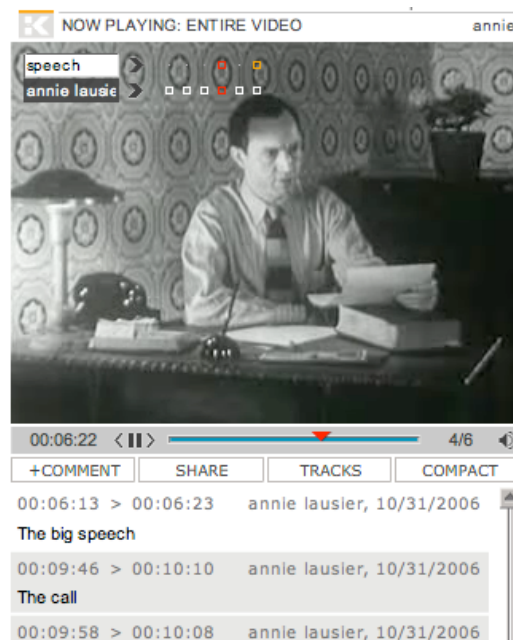
There are a few websites right now that incorporate deep tagging in online video well. One of them, veotag (www.veotag.com), allows a video uploader to create a dynamic table of contents that points to different parts of a video. This structure is intuitive and easy to navigate. However, that is all veotag does. Viewers cannot create their own tags nor can they point to specific parts of the video from outside veotag. Motionbox (www.motionbox.com) is a site that has enables URL pointers to specific portions of a video by using start and stop time variables. The video creator can specify different "scenes" of the video and tag portions, but cannot tag the whole video, nor can viewers create tags.

3.3.2 ClickTV

ClickTV (www.click.tv) is a video-tagging and -sharing web service that utilizes deep tagging for both creators and viewers. The website enables a user to upload a Flash video and comment on different portions of the video. To create a comment, the user clicks on a comment button below the video and enters the comment in a textbox. The current position of the video becomes the comment's starting point (when the comment will show up below the video). The ending point of the comment—the end of the clip—is ten seconds after the starting point by default, but may be adjusted incrementally by seconds.

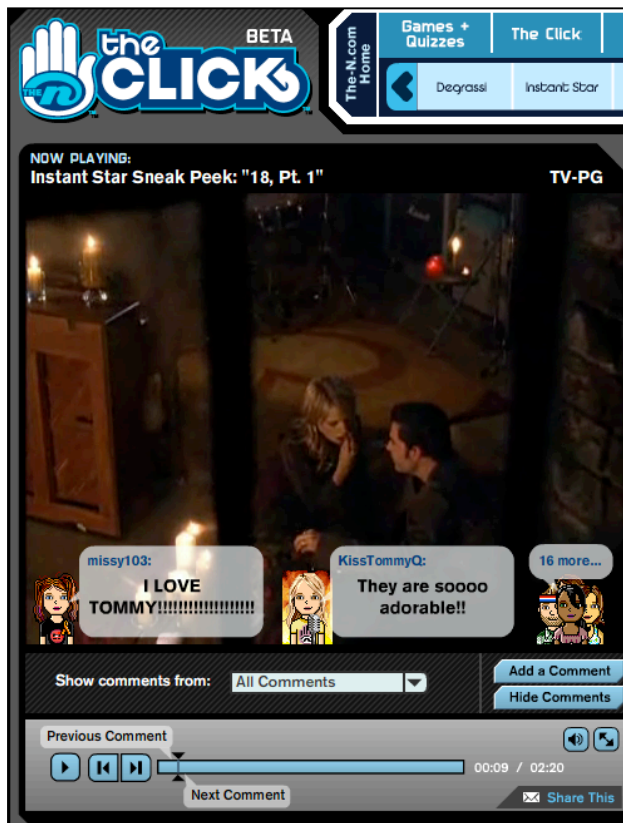
After inserting desired comments, the user may then embed the video player on a website—featuring the whole video, his or her “track” (a playlist of each clip he or she has commented on), or a selected portion of the video. As the video plays, the comments appear in a box below the video, creating a chatroom-like interface. Viewers of the embedded video player may comment at any point in the video and, in turn, embed clips on other websites. Additionally, when a viewer mouses over the video, he or she can see different users’ tracks as well as a searching mechanism. If a viewer types in a keyword to search, the results of every comment containing that keyword appear as a track. For example, in Figure 1, a search for the keyword “speech” creates a track of two commented clips that contain “speech” and displays it on top of the video.

ClickTV’s value lies within its ease of sharing video with comments as well as its support for viewer-created comments. The interface, however, is off the mark in a few ways. While one can pick clips to showcase, he or she cannot pick the order in which the clips are played. This is a setback for any projects that attempt to order clips in any way other than originally created. While starting a clip to comment is straightforward because of the marker on the timeline, there is no equivalent for the end point. The theme overlay is distracting and not representative of a video’s timeline if there are many comments in a single theme.



ClickTV, <http://www.click.tv>

3.3.3 The Click on The N



The Click, <http://www.the-n.com/theclick>

The N, or The Nighttime Network For Teens, is a Viacom company that has an extensive online community site with integrated video. The site has features such as promotional mashups, in which viewers can create their own commercial for The N with the broadcaster's properties. Also, the beta version of its upgraded video player, The Click beta, enables members to add comments on single frames. If a viewer pauses the video, all of the comments on that frame pop up with the commenters' avatars, as shown to the left.

This system is an interesting take on handling user-generated metadata. The pure volume of comments paired with the interruption of pausing if you want to see everyone's comments is a bit disruptive when trying to watch a video. However, a nice feature is the option to turn off comments or only view comments of certain members.

3.3.4 Videotater

Nicholas Diakopoulos and Irfan Essa (Georgia Tech College of Computing) have developed a Tablet PC navigation tool that allows one to select, segment, and tag video. This is a sophisticated pen-based video editor that shows a video's timeline graphically. The layout consists of a video playback window, the graphical timeline, and a tagging palette. The video's timeline wraps horizontally and is automatically split up into natural segments (scene changes); these segments are denoted by varying blue hues in the segment view (upper half) of the timeline. The bottom half of the timeline consists of a mapping of a segment's "image scent"—the pixel colors of a segment and their change over the segment. Hovering over the image scent creates a popup of that frame and allows for rapid viewing of frames. Hovering over a segment reveals the beginning and ending frames of the segment, along with the ten frames that surround each. Segment creation is achieved by drawing a vertical line from the segment view to the image scent view. The user-created line snaps nearby a naturally occurring change in image scent if one is nearby. Drawing a horizontal line between segments joins the segments. The tag

palette shows all the tags that currently exist for the video. Clicking on a tag reveals where on the timeline that tag exists. One may drag a tag onto the segment view, tagging the entire segment, or onto the image scent, tagging a single frame.

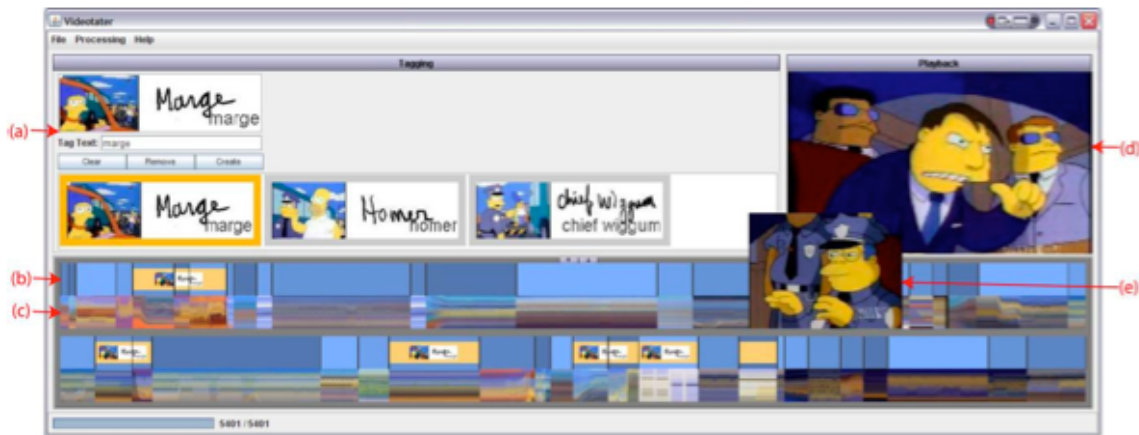


Figure 1. GUI showing (a) tag creation, (b) timeline segments, (c) timeline stripe image, (d) playback window, (e) popup frame from timeline stripe image hover. The timeline representations wrap onto the next line to avoid scrolling.

Videotater, <http://www-static.cc.gatech.edu/~nad/Projects/Videotater/index.html>

Videotater is a comprehensive editing system that was created to aid video editors by creating a more graphical and intuitive navigation system. This project focuses on the editing process, however, not the viewing experience. It is meant to be used as a tool for defining and adjusting video, not consuming it. Additionally, it deals with a single video at a time and gives no indication of its context to a larger world, such as tags of similar videos or what other people are tagging in this video.

3.3.5 Tagging in Other Media

The concept of tagging has manifested itself in many forms on the Internet. Websites such as Flickr and Facebook allow deep tagging of photographs—people who post images can tag objects within an image. The bookmarking site del.icio.us relies on user-defined tags to create categories and semantic links between bookmarked pages. People use tagging as an organizational tool as well as a way to explore data. Amazon has found many ways to tag books in relevant ways, from its recommendation system and category structure to user-created tags and lists. Map mashups have also embraced tagging, thanks to their ease of use, personalization, and social aspects. Google Map websites such as Platial and CommunityWalk allow users to create maps of places that are meaningful to them (e.g. “Where I’ve Lived”, “My Favorite Restaurants”) and share them with others. In many cases the maps are public and become collaborative (e.g. “Good Dog Parks”). This idea of creating tags has become a popular tool for navigating through large amounts of content to identify meaningful content at an individual level. In fact, Google just released a mashup-type interface within their Google Maps page entitled “MyMaps” in which users can place markers, lines, and polygons onto a Google Map and attach metadata to it. This metadata will eventually be searched by Google.

3.4 COLLABORATIVE COMMUNITIES

While many of the above sites are examples of collaborative tagging, the most popular example of online collaboration in recent years is Wikipedia, a website that can be edited by anyone. This open-source approach to information aggregation allows the site to provide knowledge from multiple sources that can be constantly updated. While entries may contain inaccuracies or omissions, many problems are discussed and corrected by other users or a panel of moderators. The website's structure is based off of the wiki, a collaborative authoring tool that allows people to add, delete, or change content on a site. The specific software package, MediaWiki was developed for Wikipedia's use, but is available to the general public for creating other wikis (ones devoted to specific television shows, for example). The structure of a wiki is not based on tags, but a highly organized categorization and linking system. Please see Appendix II for a Feature Set of the above technologies.

4 Tagging for TV

Many of the above examples contain some element of specific tagging while consuming entertainment. Tagging for TV is a television-viewing system that leverages digitized video's categorization and storage capabilities with the deep tagging and social aspect of online media. I am prototyping the system with the J.J. Abrams drama *LOST*.

4.1 WHY CREATE THIS?

4.1.1 Complex Television

We are in a new era of television. As media consumers are faced with more and more choices in a world of hundreds of channels, the Internet, and video games for home entertainment, television producers seek to create complex stories that engage their viewers' cognitive skills. Multiple storylines, nuances, and time shifts have become more common in the narrative structure of dramas such as *LOST* or *24*. Steven Johnson describes this complexity in *Everything Bad is Good For You*. He also claims that this new breed of show encourages replay, not only to uncover more subtle parts of the plot that could have been missed during the first viewing, but to build more understanding of the show as a whole. This serialized form of drama, with long story arcs, also requires regular viewing and compels viewers to continue watching episodes because of the time investment they have already put into a show that has, by nature, no overall closure (explained in Fiske's Narrative chapter of *Television Culture*).

While fans of cult classics (e.g. *Star Trek*) most certainly have existed before this age, the cross of the instant source of community of the Internet and the wide availability of source material (in the form of episode recordings, downloads, streams, and DVDs) has allowed fans to build up-to-date collaborative information repositories of their favorite shows. This information takes many forms—websites, message boards, wikis—but for the most part, it involves a collaboration to reach a better understanding of a show.

Part of the collaboration process is trying to piece different parts of a show together; the histories of different characters or recurring themes. Many shows advance multiple storylines within one episode, shift back and forth in time, and leave mysteries unsolved. In order to make sense of it all, I believe that tagging is a viable solution for organizing data. It is a system that television's target demographic has become very familiar with in the online realm. The ability to juxtapose pertinent clips or define events in a different way would be a useful way to gain more understanding of the narrative world, not only for an individual, but a whole group. This tagging information also provides valuable information about how people view content, what they deem important, and ways in which they would like to consume content.

4.1.2 A Complex Show

LOST is a perfect candidate for this system because it is complex, open-ended, and has a large fanbase that is already very used to collaborating. *LOST* relies heavily on

flashbacks to establish the identities of the characters on the island, which is an interesting take on cause and effect; the audience knows the effect—the character’s current condition and personality—but the flashbacks help reveal the cause of his or her current state. In addition to ABC airing recent episodes of the show on their streaming video player, the network has also compiled brief four-minute clips that are compilations of a *LOST* character’s

flashbacks on the show. These clips reinforce a character’s back story. The fact that ABC is creating these mini-stories shows that they are starting to think about navigating content in non-linear ways.



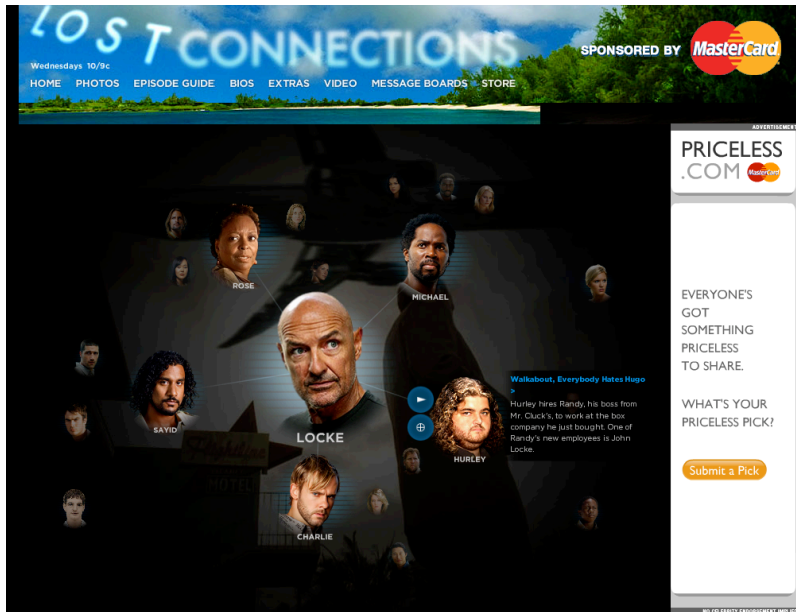
A *LOST* Back Story on Jack,

<http://abc.go.com/fsp/index.html?channel=Lost>

The series has a large presence in the online world. Two projects in particular reveal both the producers’ and fans’ comfort in mapping the show into Cyberspace. One is the MediaWiki *LOSTpedia* (lostpedia.com), a collaborative data source for fans. It currently has over 1,600 articles relating to the show, with character biographies, themes, and episode information. Another project was created by *LOST* creators during the summer of 2006, between Seasons 2 and 3. This initiative, The Lost Experience, was an alternate-reality game that expanded the storyline of the show with cross-media clues such as e-mail messages, billboards, and fake websites. The game’s storyline was not part of the show’s storyline; rather, it was a parallel storyline that helped gain understanding of the show. The project was played on multiple continents with different information, which encouraged online collaboration to uncover mysteries.

LOST creators are also making the connections between characters a little more apparent by providing them on DVDs and online. On the extras DVD of the Season 2 DVD set is a menu of video pods that are connected by pipes. Each pod represents a character and each pipe represents a connection between two characters. When the viewer clicks on a pipe, he or she is taken to another pod that plays a clip of that connection between characters from before the crash. The online application, *Connections*, is more straightforward. It contains a cloud of characters’ heads. By clicking on a character, the people with whom he or she has a connection gather around the character and by

mousing over the secondary character, one sees a text description of the connection and an icon that leads to a video popup of the connecting clip.



LOST Connections, <http://abc.go.com/primetime/lost/connections>

4.2 THE PROTOTYPE

An ideal implementation of this collaborative television-tagging project would incorporate any form of television—live broadcast, streaming online video, and DVD—so the viewing platform is irrelevant in the tagging interaction. However, time and resource constraints prevent me from implementing an all-encompassing television system. With the rise in popularity of online video being hosted by broadcasters, I think that an online video player is a viable option in which to integrate a tagging system.

4.3 BACKEND IMPLEMENTATION

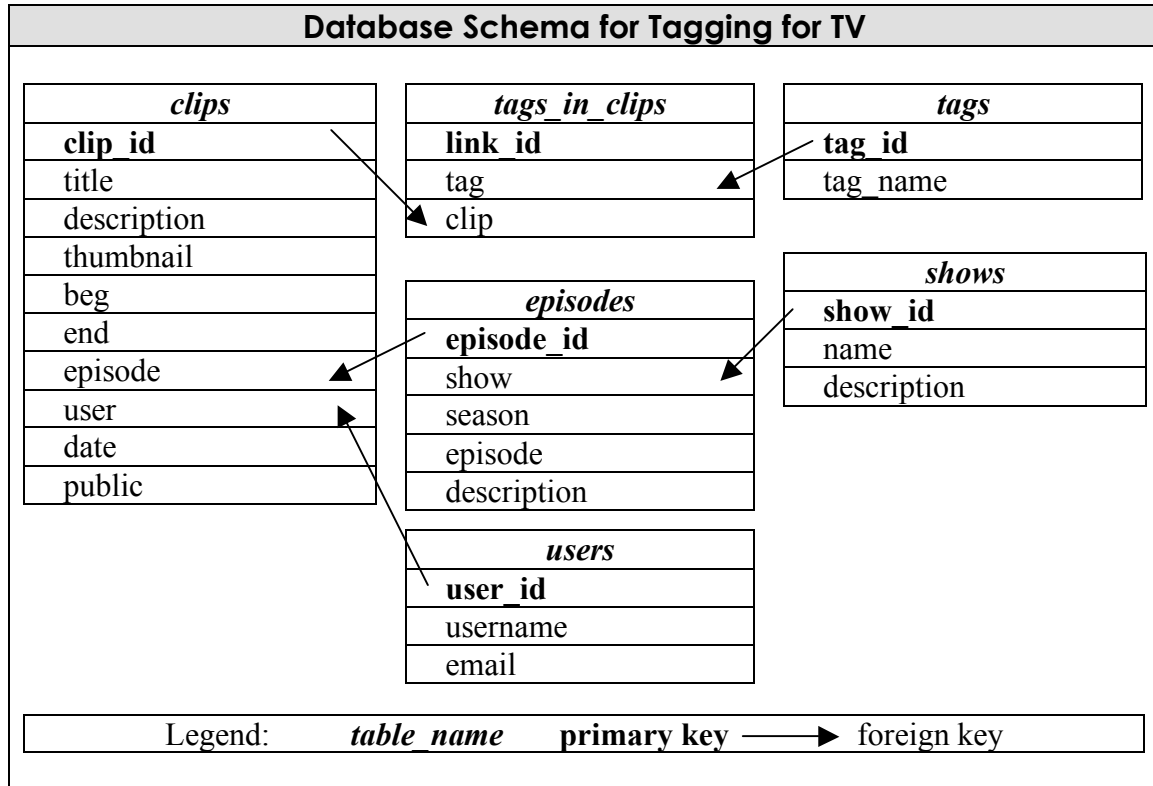
The Tagging for TV prototype is implemented with a combination of Flash, PHP, XML, and MySQL. I used Handbrake DVD-ripping software to rip the first episode of *LOST* as well as the Flash Video Encoder to convert it to Flash video for use within the Flash interface.

4.3.1 Database/Interface Flow

Tagging for TV utilizes server-side scripting technology to enable data transfer between the database and Flash interface. I am using Flash's XML object to send information to a PHP file, query the database for data, and return it to Flash in XML format. These queries include adding a clip and its tags to the database, getting clips that contain a specific tag, getting all tags, and getting clips created by a user.

4.3.2 Database Design

All of the clip data for the project is held within a MySQL database online. The database is set up with six tables: *clips*, *tags*, *tags_in_clips*, *episodes*, *shows*, and *users*. Each has the following structure:



The *clips* table holds basic information about a user-created clip, such as its title, a description, and starting and ending timecodes. The *tags* table simply holds a tag id and the tag's name, while the *tags_in_clips* table is a linking table that associates tags with clips. The *shows* and *episodes* tables provide information about the show and episode of which the clip is a part. The *users* table simply holds user information and the user id is linked to the clips a user creates.

4.3.3 Tag Implementation

The success of this system relies on a tagging system that is both easy to work with while watching content and intuitive to navigate through as an information browser. I want users to feel as if they are constructing adequate descriptions of clips they are creating but at the same time are not over-complicating the metadata system. Therefore, I have created a general tagging system in which a user can input multiple one-word tags for a clip that become part of the community tagging structure. This system is similar to YouTube's, where a video's tags help categorize a video within the YouTube world while its title and description gives the viewer a bit more information. The tag creator

may also choose to order the clips within his or her tags in a certain way to create interesting juxtapositions of content.

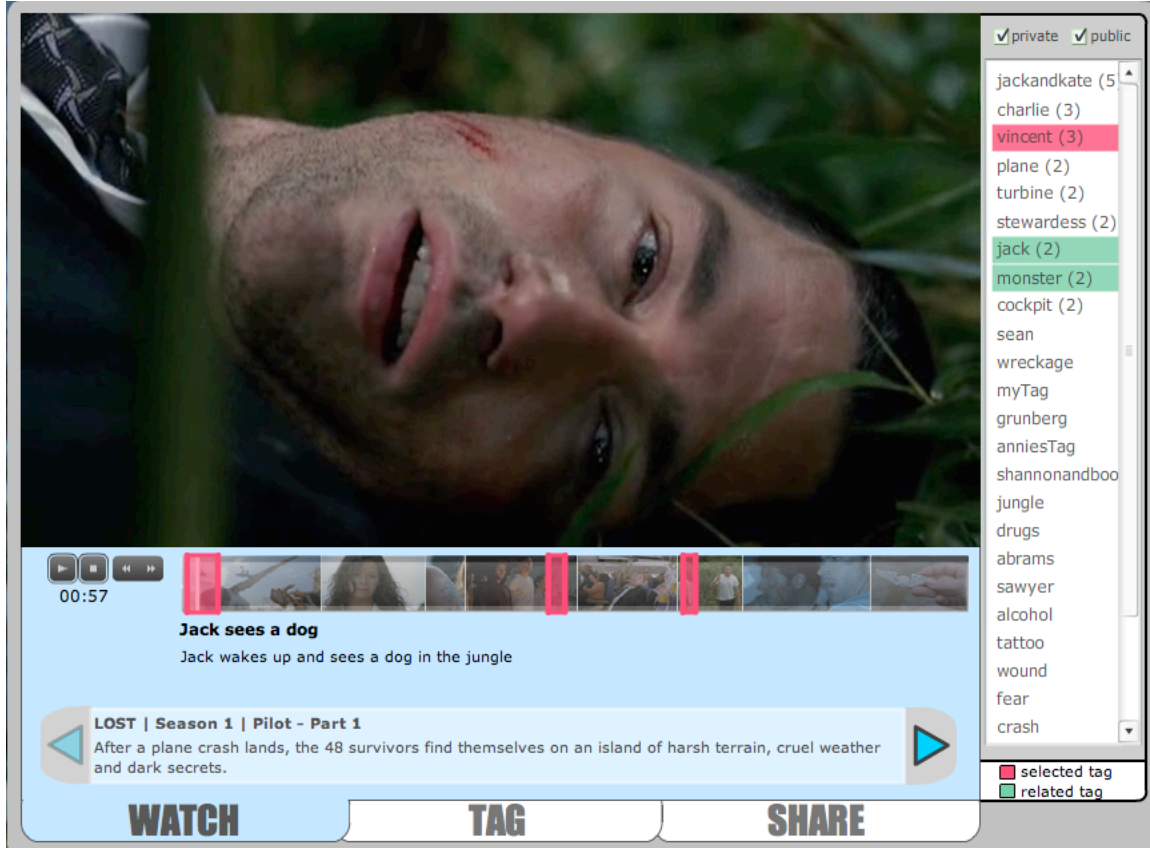
The tags may be public or private tags. If the tag is private, it will only appear to that user. If it is public, the tag and clip become a part of the tag list for that show. When one enters a tag for a clip, the php file checks to see if that tag already exists within the database and if it does, it associates that tag with the clip. If the tag does not exist in the database, it is added and associated with the clip.

When a user enters a tag to find clips for, the php file queries the database for the exact match as well as tags that contain the tag in their name. This is achieved with the following MySQL query:

```
SELECT c.*, t.tag_name
FROM clips c, tags t, link l
WHERE l.tag = t.tag_id AND l.clip = c.clip_id AND
      (t.tag_name LIKE '% $theTag %' OR
       t.tag_name LIKE '$theTag %' OR
       t.tag_name = '$theTag')
```

While I could have implemented strict name matching, I wanted to have a little flexibility for instances of such things as pluralization – especially because I am limiting tags to single words.

4.4 INTERFACE IMPLEMENTATION



The default view of the application – watch mode.

4.4.1 Video Content

The project uses progressive Flash Video play television show content. It is wrapped in a flvPlayback container that accepts traditional video navigation commands (e.g. pause, fast forward, seek) via video components and ActionScript. This functionality is key in allowing customizable features to control the video.

4.4.2 Watch Mode

The default control interface below the video is Watch mode. It consists of a timeline that also serves as a chapter-navigation menu filled with contextual images. Each image represents a pre-defined chapter and its width represents the chapter's length. If clicked, the video begins playing at the beginning of that section.

Below the timeline is a bar revealing information about the particular episode being shown, such as the show name, season number, and episode name. Forward and back arrows buttress the episode information bar; they allow the user to select the next and previous episodes (if available).

To the right of the video player is a frame that contains a list of tags (ordered by popularity). Checkboxes allow the user to indicate whether he or she would like to view public tags, his or her private tags, or both. When one clicks on a tag, rectangles that represent clips that are related to that tag are superimposed on the video's timeline. When one rolls over a rectangle on the timeline, the clip's information appears in the form of a tooltip, which includes a title and description. Tags for that clip are highlighted to the right. One may click on the rectangle to play the particular clip.



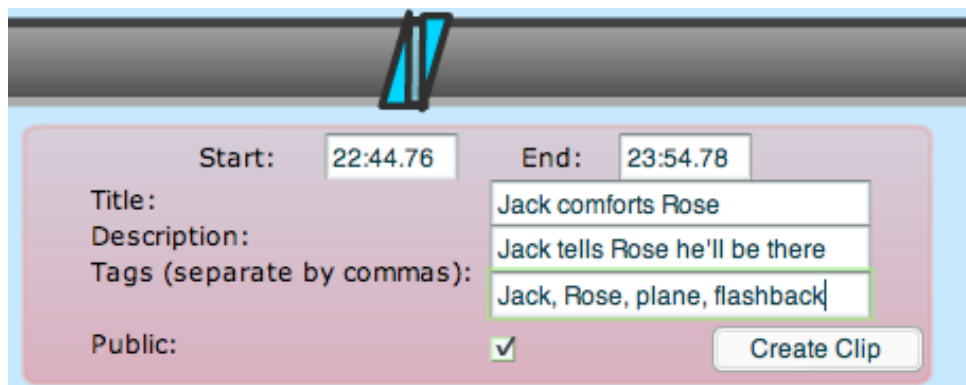
The clip tooltip.

One important facet of this content-based navigation is the cross-episodic nature of related tags. The most immediate solution I found to represent this case was a flashing border around the episode navigation markers (next and previous episodes) to indicate that more clips related to a tag resides outside of the current episode. It must be noted that this form of interaction relies on chronological navigation to reach the content.

4.4.3 Tag Mode

The tag mode allows a user to create a clip. It features the same navigational timeline as in the watch mode, but instead of the bar indicating the current place in the video, there are two triangles that indicate the start and end points of the clip to be created. By default, the beginning start point for the clip is the current point playing in the video and the ending point is about two minutes later. One can drag each triangle to modify the start and end point to anywhere within the episode. The starting point is limited in movement to only points in front of the ending point and vice versa.

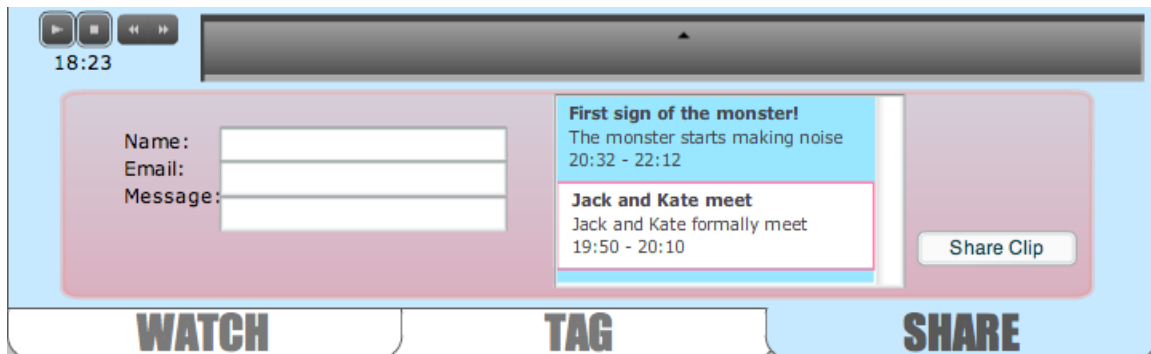
The mode also features a clip creation box that has user input for the clip information. The clip name, description, and tags are asked for, as well as whether the user desires for the clip to be public or private. If the clip is public, it is added to the library for anyone to browse; if it is private, only that user may access it. When the user hits the Create Clip button, the clip and its tags are added and they are shown in the tag bar to the right.



The clip creation box and markers for specifying start and end points.

4.4.4 Share Mode

The share mode allows users to share clips with others. The clip may be the current clip playing or any other clip (chosen from a list). It is important to note that the sharing of a clip does not include any transfer of media; the recipient will merely be given a link back to the application with clip information so that the video may start and end at the right point. I did not have time to implement this portion of the system, but I did develop the following interface for it.



18:23

Name:

Email:

Message:

First sign of the monster!
The monster starts making noise
20:32 - 22:12

Jack and Kate meet
Jack and Kate formally meet
19:50 - 20:10

Share Clip

WATCH **TAG** **SHARE**

The Share mode.

5 Implications

This project melds traditional video content with user-generated metadata. Not only does it allow an individual to easily access his or her own clips, but it also forms the basis of a mass-generated categorization structure. Instead of having only a content producer's segmentation of content to follow, a viewer in this television-watching environment has a multitude of peer definitions of the content at his or her disposal. These definitions will make it much easier to get what a viewer wants to see and encourage him or her watch the relevant content being continuously served.

Beyond the advantage of navigation choices for a viewer, the metadata collected from the public can be extremely valuable for show producers, broadcasters, and advertisers – in two distinct ways. First of all, the data can provide metrics for viewership and interaction patterns: How many people are watching/rewatching a show? How much time are they devoting to interacting with the content? What parts of an episode do people seem to enjoy most? What parts generate the most conversation? How do people interpret a quote or piece of imagery? When are people watching? This system can answer these questions and provide insight to producers.

A second added value to creators is what tags can become if used enough – a reliable source of metadata attached to video. Currently, metadata is hard to apply to video because video is difficult for computers to interpret in the way that humans do; thus it is hard to automate metadata for video. Some companies, such as blinkx

(www.blinkx.com), are applying voice recognition software to video to aid in defining it, but even voice does not tell the whole story when it comes to video.

In order to see how tagging can be used as an information source, I would like to take a look at how tagging is used in general and try to apply it to tagging for television content. In “The Structure of Collaborative Tagging Systems”, Golder and Huberman explore how people tag webpages on the social bookmarking site del.icio.us. They break tags down into seven categories [Golder and Huberman, 6], for which I will attempt to provide a television equivalent (please see pg. 20).

As evidenced by the table, there are many types of tags and elaborate mechanisms in place when it comes to defining content. I believe that this zeal for divulging into content will cross over to the television medium once it becomes available to people, especially with a rise in complex shows. When more and more people tag shows in ways that are relevant to them, they collectively become tags that are relevant to the audience as a whole. And learning what is relevant to an audience is priceless to the creators and executives.

Type of Tag	Delicious Bookmark Tags (Golder and Huberman)	Possible Television Tag Equivalents
Identifying What (or Who) it is About	Overwhelmingly, tags identify the topics of bookmarked items. These items include common nouns of many levels of specificity, as well as many proper nouns, in the case of content discussing people or organizations.	This tag type can be used to describe diegetic as well as non-diegetic things (Jack vs. Matthew Fox, the <i>LOST</i> island vs. Hawaii, a tattoo meaning that Jack is a leader vs. a tattoo Matthew Fox got with other <i>Party of Five</i> cast members).
Identifying What it Is	Tags can identify what <i>kind</i> of thing a bookmarked item is, in addition to what it is about. For example, article, blog and book.	This tag type could be used to describe the type of show – comedy, documentary – or the type of content within a show – interview, theme song, outtake, montage.
Identifying Who Owns It	Some bookmarks are tagged according to who owns or created the bookmarked content. Given the apparent popularity of weblogs among Delicious users, identifying content ownership can be particularly important.	This type of tag could be used for enthusiasts of specific directors, writers, or news journalists. It could also be used to denote broadcasters.
Refining Categories	Some tags do not seem to stand alone and, rather than establish categories themselves, refine or qualify existing categories. Numbers, especially round numbers (e.g. 25, 100), can perform this function.	This could also be used for refining television content tags.
Identifying Qualities or Character- istics	Adjectives such as scary, funny, stupid, inspirational tag bookmarks according to the tagger's opinion of the content.	This type of tag could definitely be used for personal organization as well as for displaying sentiment to the public.
Self Reference	Tags beginning with "my," like mystuff and mycomments identify content in terms of its relation to the tagger.	This tag type could be used often, especially for private tags (myrecipes, myguiltypleasures)
Task Organizing	When collecting information related to performing a task, that information might be tagged according to that task, in order to group that information together. Examples include toread, jobsearch. Grouping task-related information can be an important part of organizing while performing a task (Jones et al. 2005).	Probably would not be used as much, as television watching does not necessarily spur action. It could, however, be a call to look into something (e.g. using the tag "lookup" to research the latest on a news report about rat poison in cat food) or remember content that was enjoyed ("findmore" Church Lady Saturday Night Live clips).

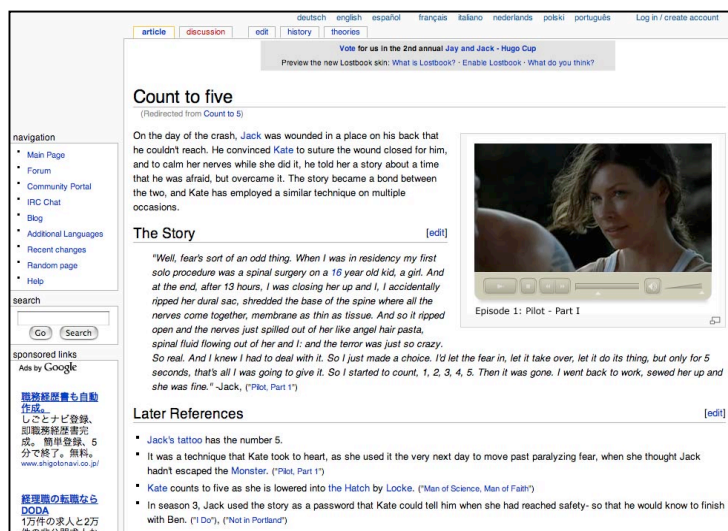
6 Future Development

This project served as a proof of concept that tagging could be applied as an alternate means of organization and navigation for television. I devoted a lot of time to Flash video manipulation as well as interface development. To that end, I would like to advance the tagging structure more – refine searching, allow for multiple tag searches, sort tags by categories such as date, popularity, or relevance, and refine search results. The current system assumes that a user enters all information correctly and offers no form of recourse if an error is made. It also does little to aggregate common tags (e.g. capitalized vs. lowercase words) on the server side, which is something I would like to pursue – making the tag system smarter.

Also, the clip-making timeline marker mechanisms are simple; I would like to develop them beyond their basic drag-and-drop functionality. I would like to dynamically zoom in to a finer granularity for better precision, allow for better previews of the endpoints being selected, and incorporate whole clip previews.

I also think that while collaborative tagging creates a unique community within itself, expanding the community aspect of the application would be very useful. I would like to expand the identity of a user – for example, show all clips created by a specific user and reveal more data about him or her (such as a profile).

And although I wanted to centralize the video in a single location to provide a consistent viewing experience, I would also like to experiment with integrating video with more information-based environments such as wikis. A lot of information pertaining to shows already exists. If video could be integrated in some way, that would provide much more information than a text description or thumbnail. This of course would require attention to topics such as copyrighting, fair use, and advertiser/broadcaster considerations. Below is a mockup of video integration with Lostpedia. The video would play clips associated with the page's content and possibly suggest other clips based on similar themes. When the video player plays a clip with relevant content that resides elsewhere on the site, the text could reload (not the whole page) as to not disrupt the video-viewing experience.



A possible Lostpedia/video interface


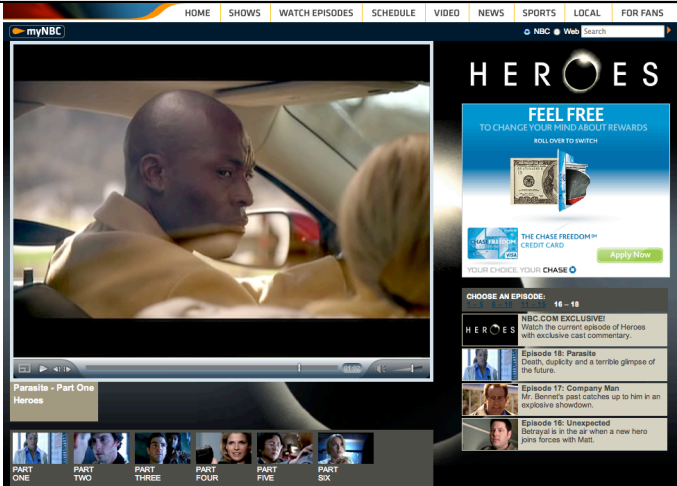
7 Conclusion

Television has been evolving both in terms of its complexity and its migration onto different viewing platforms. The computer has helped to organize massive amounts of data in relevant ways for users, and organizational systems such as tagging have been easy for users to incorporate for their own content. The combination of these developments, combined with the widespread adoption of rich media both online and proliferated across many platforms, has shown that people are already consuming entertainment in a networked manner.

My goal with Tagging for TV was to create an easy-to-use video player that allows for the creation of clips and relevant tags to go with those clips, along with an efficient way to browse those clips by tag. The project is a conceptual application that allows one to “lean back” and simply watch television or also to “lean forward” and truly take command of the video by defining it in one’s own terms and watch it.

While it is a system designed for optimal user interaction, I believe that this application could be particularly beneficial to a television community that recognizes the importance of video in the online space but hasn’t quite grasped how to define it beyond episodes. Also, because it gives power to the people, it encourages replay and reinforces the brand. These days, people want to explore the ins and outs of intricate shows. Tagging for TV is a dynamic social answer to the problem of adding context to content.

8 Appendix I: Network Broadband Video Players

ABC Streaming Video Player	
<p>ABC launched their online video player in May 2006. It features a carousel navigation of show thumbnails as well as thumbnails and synopses of episodes available for viewing. The traditional commercial breaks are replaced with 30-second spots by the same advertiser throughout the episode. These commercials, which are often interactive, cannot be skipped over. The latest implementation allows full-screen viewing.</p>	 <p>http://dynamic.abc.go.com/streaming Accessed March 30, 2007</p>
NBC Rewind	
<p>The NBC Rewind Full Episode Player has an L-shaped layout with episode parts navigable via the horizontal row of thumbnails below the video. Like ABC's player, this player includes a sponsorship and commercials at the start of each section. A listing of episodes is in the bottom right.</p>	 <p>http://www.nbc.com/Video/rewind/full_episodes Accessed March 30, 2007</p>

CBS Innertube

CBS Innertube launched in May 2006. Each episode is split into parts and shows an ad in between them. The player features hierarchical navigation within one window –genres, specific shows, and available episodes – as well as breadcrumb navigation. Related videos are listed in the bottom lefthand corner.

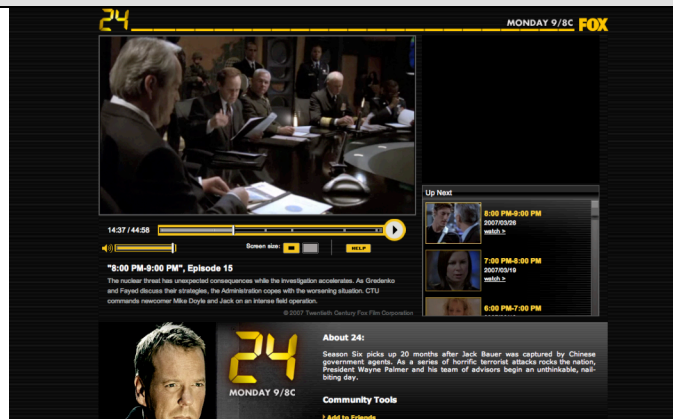


<http://www.cbs.com/innertube>

Accessed March 30, 2007

FOX on Demand

FOX on Demand debuted in the Fall of 2006 on its branded MySpace profile page. The FOX Full Throttle Player offers streaming shows in HD. Each show has its own profile page that features episodes as well as MySpace community features (friends and a message board).



<http://www.myspace.com/fox>

Accessed March 30, 2007

9 APPENDIX II: Related Work Feature Set
As of April 2007

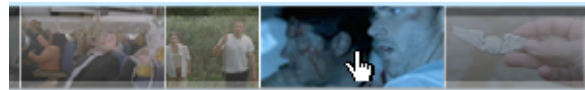
	Full-Length Television Content	Deep Tagging	Sharing	Community (Comments, Ratings)	Tagging	Categories
Online Television						
ABC Media Player	x		x			x
NBC Video Player	x		x	x		x
CBS InnerTube	x		x			x
iTunes downloading	x					x
TV Technologies						
TiVo	x					x
VOD	x					x
Windows Media Center	x					x
Apple's iTV	x					x
DVD	x					x
Onyx Project	x				x	x
Online Video						
YouTube			x	x	x	x
Revver			x	x	x	x
Google Video	x		x	x	x	x
Blinkx			x	x	x	x
Deep Tagging in Video						
veotag		x	x		x	
MotionBox		x	x		x	x
ClickTV		x	x	x	x	x
Videotater	x	x			x	
Tagging Sites						
Flickr		x	x	x	x	x
Del.icio.us			x		x	x
Amazon			x	x	x	x
Platial			x		x	x
CommunityWalk			x		x	x
Collaborative Sites						
Wikipedia				x		x
Proposed Project						
Tagging for TV	x	x	x	x	x	x

10 APPENDIX III: Demo Script

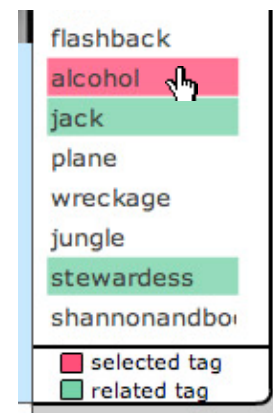
1. Open the application at <http://dm.gatech.edu/~alausier/thesis/t4t>. It will show a video (when loaded), a timeline and video controls, show and episode information, a tag bar to the right, and WATCH, TAG, and SHARE tabs along the bottom.



2. After the video has loaded, roll over the image timeline and click on a thumbnail.



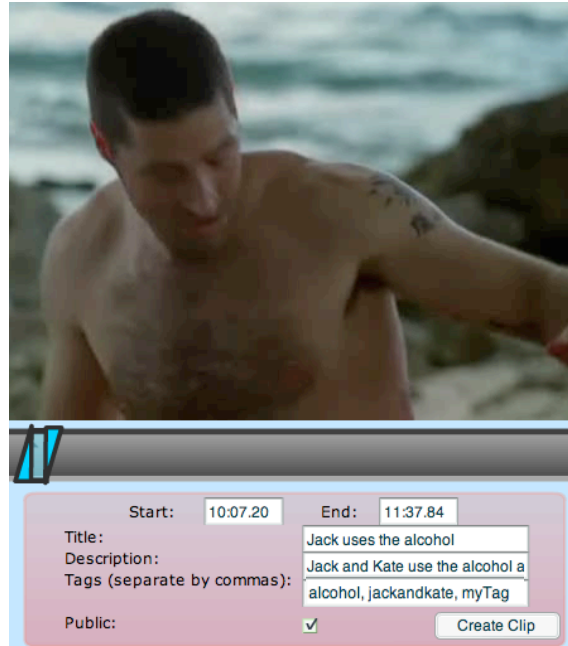
3. The video begins to play at the selected section. In the tag bar to the right, click on the “alcohol” tag. The tag will be highlighted in pink and related tags will be highlighted in green.



4. A pink rectangle appears on the timeline. Rollover it and see information about it and then click on it.



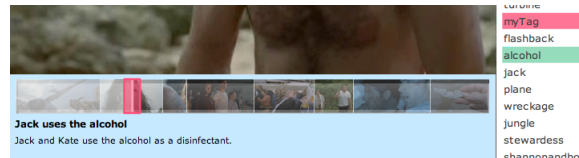
5. The clip of Jack drinking on the plane will play. When it is finished, click on the TAG tab. This will load a new interface that allows you to create a clip and add it to the database. Adjust the blue arrows along the timeline to play with navigation. In the submission box, type **10:08** and **11:37**, respectively, in the **Start** and **End** text fields. In the **Title** field, enter a title such as **Jack uses the alcohol**. For **Description**, type something similar to **Jack and Kate use the alcohol as a disinfectant**. Enter **alcohol, jackandkate**, and a unique name, such as **myTag**, to the **Tags** field. Keep the **Public** checkbox checked and press the **Create Clip** button.



The screenshot shows a video player at the top with a shirtless man. Below it is a form with the following fields:

- Start:** 10:07.20
- End:** 11:37.84
- Title:** Jack uses the alcohol
- Description:** Jack and Kate use the alcohol a
- Tags (separate by commas):** alcohol, jackandkate, myTag
- Public:** ☒
- Create Clip** button

6. Press the WATCH tab again. Find the **myTag** tag in the tag bar and select it. Click on the pink rectangle that appears in the timeline and the clip you just created plays.



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